Space Weather Highlights **SEC PRF 1657**
28 May – 03 June 2007 **05 June 2007**

Solar activity ranged from very low to high levels this period. Very low conditions occurred on 28 – 29 May, while low levels were observed on 30 – 31 May. From 01 – 03 June, conditions elevated to moderate to high. Activity started on 30 May with a C2.2 flare that originated from a region behind the east limb. This new region rotated onto the visible disk on 01 June and was numbered Region 960 (S09, L=177, class/area, Fkc/540 on 03 June). From 01 – 03 June, the region produced 8 M-class flares, the largest an M7.0 x-ray event that peaked at 03/0212 UTC.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit reached high levels during the entire period.

Geomagnetic field activity was at mostly quiet levels the entire period. Isolated unsettled levels were observed late on 03 June. ACE data indicated a peak velocity of about 625 km/s at 28/0000 UTC and a minimum velocity of near 300 km/s midday on 31 May. The Bz component of the IMF did not vary much beyond +/- 2 nT from 28 May to late 31 May. By early on 01 June, the Bz began rotating through +10 nT to -6 nT, and remained so during the balance of the summary period.

Space Weather Outlook
06 June – 02 July 2007

Solar activity is expected to be at low to moderate levels with a slight chance for high activity until Region 960 rotates around the western limb on 14 June. Very low to low levels are expected from 15– 28 June. Activity is expected to increase to low to moderate levels after 28 June due to the return of old Region 960 (S09, L=177).

There is a slight chance for a greater than 10 MeV proton event from significant flare activity from Region 960 through 14 June.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at normal levels during 06 – 19 June, high levels during 20 June – 01 July, and normal levels again on 02 July.

Quiet conditions are expected during 06 – 13 June. An increase to unsettled to active periods is expected during 14 – 15 June due to a recurrent coronal hole high-speed stream. Quiet to unsettled conditions are expected during 16 – 18 June. Another recurrent coronal hole high-speed stream is expected to affect the field during 19 – 23 June. Unsettled to minor storm conditions are expected during this time with major storm periods possible at high latitudes. Activity is expected to decrease to quiet to unsettled levels during 24 – 29 June. An increase to unsettled to active periods is expected during 30 June – 01 July due to a recurrent coronal hole high-speed stream. Quiet conditions will return by 02 July.

Daily Solar Data

Date	Radio Flux 10.7 cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background	Flares: X-ray Flux C	M	X	Flares: Optical S	1	2	3	4
28 May	69	0	0	<A1.0	0	0	0	0	0	0	0	0
29 May	70	11	30	<A1.0	0	0	0	0	0	0	0	0
30 May	71	12	30	<A1.0	1	0	0	0	0	0	0	0
31 May	75	11	0	A5.1	1	0	0	0	0	0	0	0
01 June	79	41	340	B1.0	1	3	0	2	0	0	0	0
02 June	83	45	520	A9.9	0	2	0	1	0	0	0	0
03 June	87	58	570	A8.3	2	3	0	2	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2}-day-sr) >1 MeV	>10 MeV	>100 MeV	Electron Fluence (electrons/cm^2-day-sr) >.6 MeV	>2MeV	>4 MeV
28 May	3.5E+6	1.6E+4	3.6E+3		9.9E+8	
29 May	4.0E+6	1.8E+4	4.4E+3		1.2E+9	
30 May	4.3E+6	1.7E+4	4.0E+3		1.4E+9	
31 May	6.5E+6	1.8E+4	4.3E+3		1.3E+9	
01 June	5.7E+6	1.8E+4	4.2E+3		2.4E+8	
02 June	4.0E+6	1.8E+4	4.0E+3		6.7E+7	
03 June	3.4E+6	1.7E+4	4.0E+3		1.0E+8	

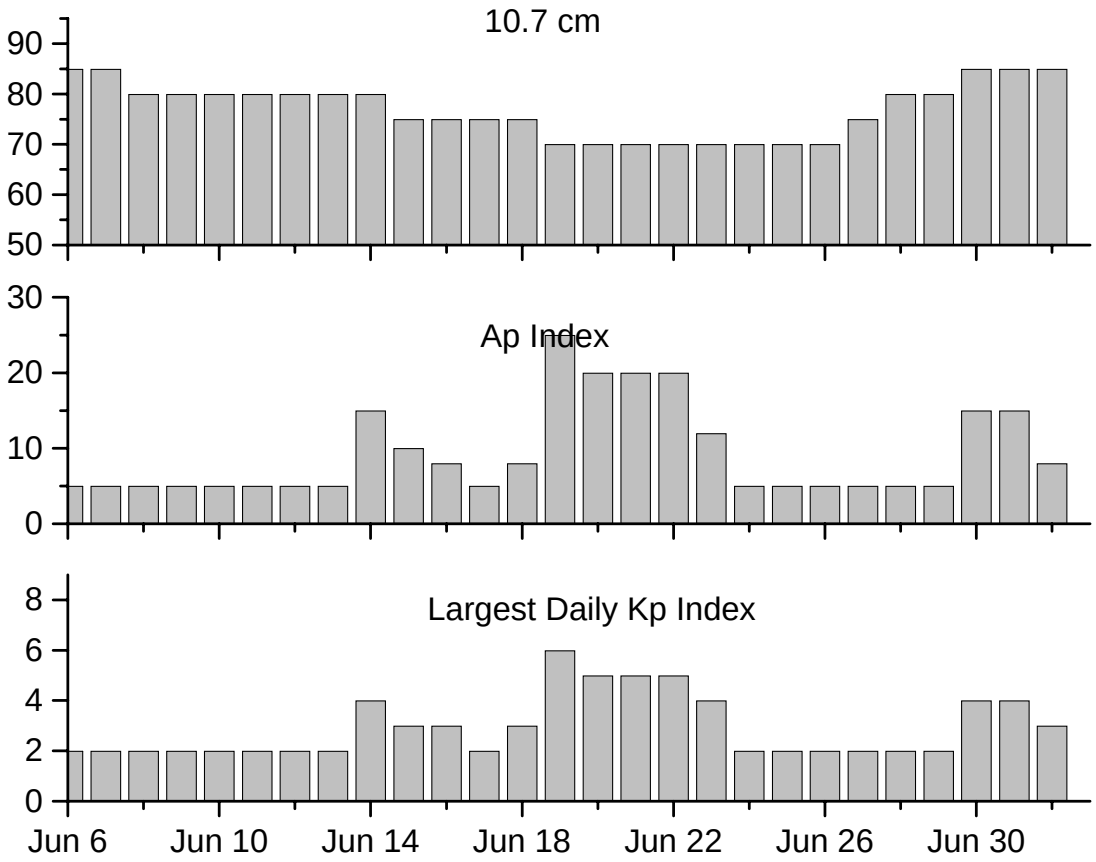
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg A	K-indices	High Latitude College A	K-indices	Estimated Planetary A	K-indices
28 May	5	3-2-1-1-1-0-1-1	4	3-2-2-1-0-0-0-0	5	3-2-1-1-1-0-0-1
29 May	5	1-1-2-1-1-2-1-2	3	1-1-1-1-2-1-0-0	4	1-1-1-0-1-2-1-1
30 May	3	2-1-1-1-1-1-0-0	2	1-1-1-0-0-0-1-0	4	2-1-1-0-1-1-1-1
31 May	2	1-0-0-0-1-1-1-2	1	1-0-0-0-0-0-0-2	4	1-0-0-0-1-1-1-3
01 June	5	2-1-1-1-1-2-2-2	5	2-2-1-2-1-1-1-1	6	2-2-1-1-1-2-2-2
02 June	5	2-2-2-1-1-1-1-2	4	2-2-2-0-0-1-1-1	7	2-2-2-1-1-2-1-2
03 June	7	1-1-1-1-2-2-3-3	6	2-1-1-0-1-2-3-2	10	2-2-1-1-1-3-4-3

Alerts and Warnings Issued

Date & Time of Issue	Type of Alert or Warning	Date & Time of Event UTC
28 May 0501	ALERT: Electron 2MeV Integral Flux >1000pfu	28 May 0500
29 May 0502	ALERT: Electron 2MeV Integral Flux >1000pfu	29 May 0500
30 May 0509	ALERT: Electron 2MeV Integral Flux >1000pfu	30 May 0500
31 May 0517	ALERT: Electron 2MeV Integral Flux >1000pfu	31 May0500
01 Jun 0908	ALERT: Electron 2MeV Integral Flux >1000pfu	01 Jun 0850
01 Jun 1507	SUMMARY: 10cm Radio Burst	01 Jun 1453
02 Jun 1330	ALERT: Electron 2MeV Integral Flux >1000pfu	02 Jun 1315
03 Jun 0211	ALERT: X-Ray Flux >M5	03 Jun 0211
03 Jun 0225	SUMMARY: X-ray Event M7.0	03Jun 0212
03 Jun 0955	ALERT: Type II Radio Emission	03 Jun 0932
03 Jun 1051	ALERT: Electron 2MeV Integral Flux >1000pfu	03 Jun 1035
03 Jun 1542	SUMMARY: 10cm Radio Burst	03 Jun 0641
03 Jun 1625	WARNING: Geomagnetic K=4	03 Jun 1625 - 2359
03 Jun 1712	ALERT: Geomagnetic K=4	03 Jun 1710

Twenty-seven Day Outlook



Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7 cm	Planetary A Index	Largest Kp Index
06 June	85	5	2	20 June	70	20	5
07	85	5	2	21	70	20	5
08	80	5	2	22	70	20	5
09	80	5	2	23	70	12	4
10	80	5	2	24	70	5	2
11	80	5	2	25	70	5	2
12	80	5	2	26	70	5	2
13	80	5	2	27	75	5	2
14	80	15	4	28	80	5	2
15	75	10	3	29	80	5	2
16	75	8	3	30	85	15	4
17	75	5	2	01 July	85	15	4
18	75	8	3	02	85	8	3
19	70	25	6				

Energetic Events

Date	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
	Begin	Max	½ Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV
01 Jun 07	0646	0651	0659	M1.0	.005			960				
01 Jun 07	1435	1459	1511	M2.8	.029	Sf	S08E78	960		100		
01 Jun 07	2140	2152	2159	M2.1	.011	Sf	S09E82	960				
02 Jun 07	0525	0611	0619	M2.5	.020	Sf	S09E77	960				
02 Jun 07	1028	1035	1041	M1.0	.004							
03 Jun 07	0151	0159	0204	M2.4	.008	Sb	S10E68	960				
03 Jun 07	0206	0212	0216	M7.0	.028							
03 Jun 07	0636	0641	0643	M4.5	.009	Sf	S06E63	960		330		

Flare List

Date	Time			Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
	Begin	Max	End				
28 May	**No Flares Observed**						
29 May	**No Flares Observed**						
30 May	1349	1415	1454	C2.0			
31 May	0145	0155	0212	B1.9			960
	1014	1022	1032	B1.6			958
	1243	1253	1302	C1.1			960
	1757	1804	1823	B3.7			959
	2216	2221	2231	B4.4			960
	2243	2254	2304	B5.4			960
01 June	0134	0141	0147	B4.1			960
	0646	0651	0659	M1.0			960
	0846	0905	0917	B4.9			960
	1022	1032	1036	B1.8			960
	1224	1235	1250	B6.9			960
	1319	1323	1328	B3.7			960
	1417	1422	1427	B6.6			960
	1457	1459	1503	M2.8	Sf	S08E78	960
	1701	1710	1713	B3.3			960
	2013	2019	2025	B2.2			960
	2115	2125	2136	B4.9			960
	2150	2150	2154	M2.1	Sf	S09E82	960
	2217	2222	2226	C2.8			960

Flare List-Continued

Date	Time Begin	Time Max	Time End	Optical X-ray Class.	Imp / Brtns	Location Lat CMD	Rgn
02 June	0130	0135	0140	B1.7			
	0240	0244	0253	B1.7			
	0330	0337	0348	B3.5			
	0606	0606	0625	M2.5	Sf	S09E77	960
	0757	0800	0803	B3.6			
	0821	0833	0838	B7.8			
	0923	0926	0928	B1.5			
	0930	0933	0937	B1.9			
	1028	1035	1041	M1.0			
	1518	1521	1523	B2.0			
	1529	1532	1534	B1.9			
	1741	1744	1746	B2.2			
	1810	1813	1815	B1.7			
	1917	1920	1925	B1.2			
	2007	2013	2022	B1.4			
	2104	2110	2116	B7.6			
	2254	2258	2300	B1.8			
03 June	0041	0052	0057	B3.6			
	0057	0102	0108	B4.7			
	0128	0134	0140	B8.8			
	0158	0158	0222	M2.4	Sb	S10E68	960
	0206	0212	0216	M7.0			
	0231	0236	0241	C1.6			
	0405	0415	0431	B9.5			
	0519	0522	0525	B2.1			
	0618	0622	0626	B1.6			
	B0640	U0640	0647	M4.5	Sf	S06E63	960
	0923	0928	0931	C5.3			
	1118	1126	1130	B3.3			
	1810	1816	1821	B6.0			
	1843	1847	1850	B1.6			
	2015	2040	2052	B5.5			
	2335	2339	2343	B1.9			

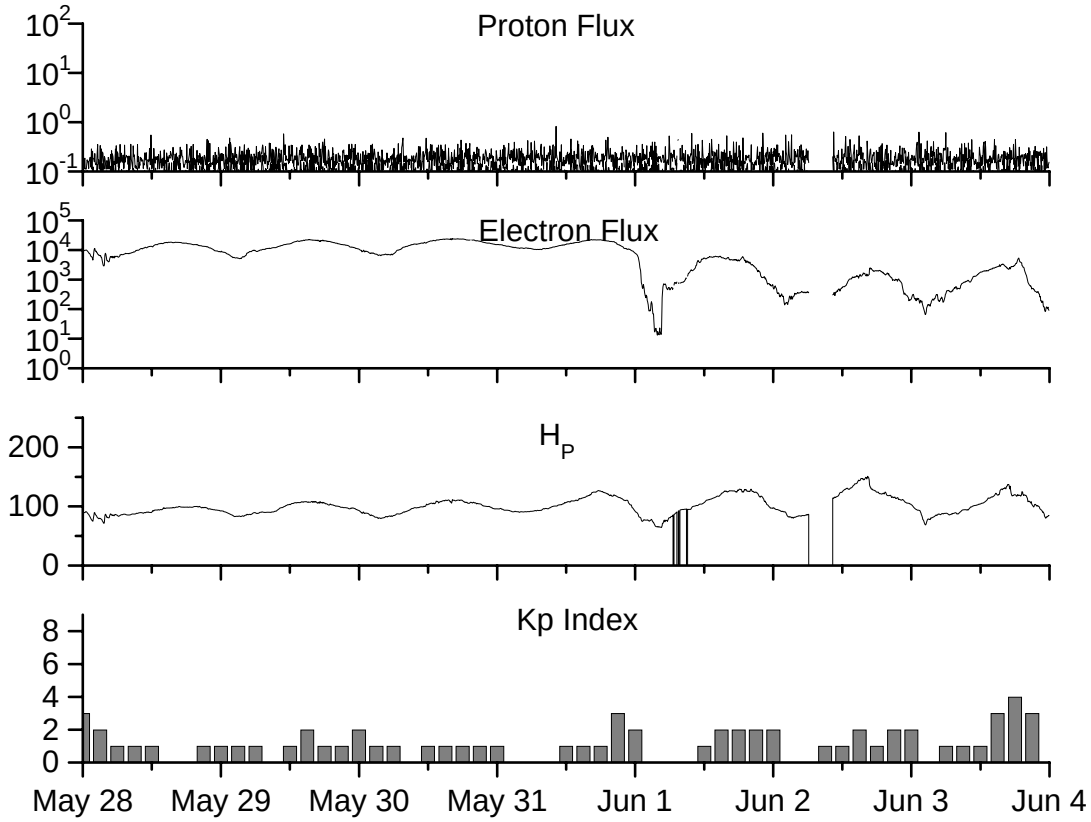
Region Summary

Date	Location (° Lat ° CMD)	Helio Lon	Area (10^{-6} hemi)	Extent (helio)	Spot Class	Spot Count	Mag Class	Flares: X-ray C	X-ray M	X-ray X	Optical S	Optical 1	Optical 2	Optical 3	Optical 4
					Region 958										
29 May	S13E62	231	0030	01	Axx	001	A								
30 May	S13E49	231	0030	01	Hax	002	A								
31 May	S13E35	232	0000	01	Axx	001	A								
01 Jun	S13E22	232	0010	05	Bxo	004	B								
02 Jun	S12E13	227	0010	01	Hsx	001	A								
03 Jun	S09W03	230	0010	02	Bxo	002	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 230															
					Region 959										
01 Jun	S12E49	205	0010	04	Bxo	002	B								
02 Jun	S12E36	204	0030	04	Cso	002	B								
03 Jun	S10E27	200	0020	04	Bxo	003	B								
								0	0	0	0	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 200															
					Region 960										
01 Jun	S06E73	181	0320	10	Dki	005	B	1	3		2				
02 Jun	S07E62	178	0480	16	Fkc	012	Bgd		1		1				
03 Jun	S09E50	177	0540	16	Fkc	023	Bgd		2		2				
								1	6	0	5	0	0	0	0
Still on Disk.															
Absolute heliographic longitude: 177															

Recent Solar Indices (preliminary)
of the observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed	values	Ratio	Smooth	values	*Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2005					
May	65.4	42.6	0.65	48.3	29.0	99.5	93.2	20	14.8
June	59.8	39.6	0.66	47.9	28.9	93.7	91.9	13	13.9
July	71.0	39.9	0.56	48.1	29.2	96.6	90.9	16	13.1
August	65.6	36.4	0.55	45.4	27.5	90.7	89.3	16	12.2
September	39.2	22.1	0.56	42.9	25.9	90.8	87.8	21	11.8
October	13.0	8.5	0.65	42.6	25.5	76.7	87.4	7	11.6
November	32.2	18.0	0.56	42.1	24.9	86.3	86.7	8	11.1
December	62.6	41.2	0.66	40.1	23.0	90.8	85.4	7	10.4
				2006					
January	28.0	15.4	0.55	37.2	20.8	83.8	84.0	6	9.9
February	5.3	4.7	0.89	33.4	18.7	76.6	82.6	6	9.2
March	21.3	10.8	0.51	31.0	17.4	75.5	81.6	8	8.4
April	55.2	30.2	0.55	30.6	17.1	89.0	80.9	11	7.9
May	39.6	22.2	0.56	30.7	17.3	81.0	80.8	8	7.9
June	37.7	13.9	0.37	28.9	16.3	80.1	80.6	9	8.3
July	22.6	12.2	0.54	27.2	15.3	75.8	80.3	7	8.7
August	22.8	12.9	0.57	27.6	15.6	79.0	80.3	9	8.7
September	25.2	14.5	0.58	27.7	15.6	77.8	80.2	8	8.7
October	15.7	10.4	0.66	25.2	14.2	74.3	79.4	8	8.6
November	31.5	21.5	0.68			86.4		9	
December	22.2	13.6	0.61			84.3		15	
				2007					
January	26.6	16.9	0.64			83.5		6	
February	17.2	10.6	0.62			77.8		6	
March	9.7	4.8	0.49			72.3		7	
April	6.9	3.7	0.54			72.4		9	

NOTE: All smoothed values after September 2002 and monthly values after March 2003 are preliminary estimates. The lowest smoothed sunspot index number for Cycle 22, RI = 8.0, occurred in May 1996. The highest smoothed sunspot number for Cycle 23, RI= 120.8, occurred April 2000. *After June 1991, the 10.7 cm radio flux data source is Penticton, B.C. Canada. Prior to that, it was Ottawa.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 28 May 2007

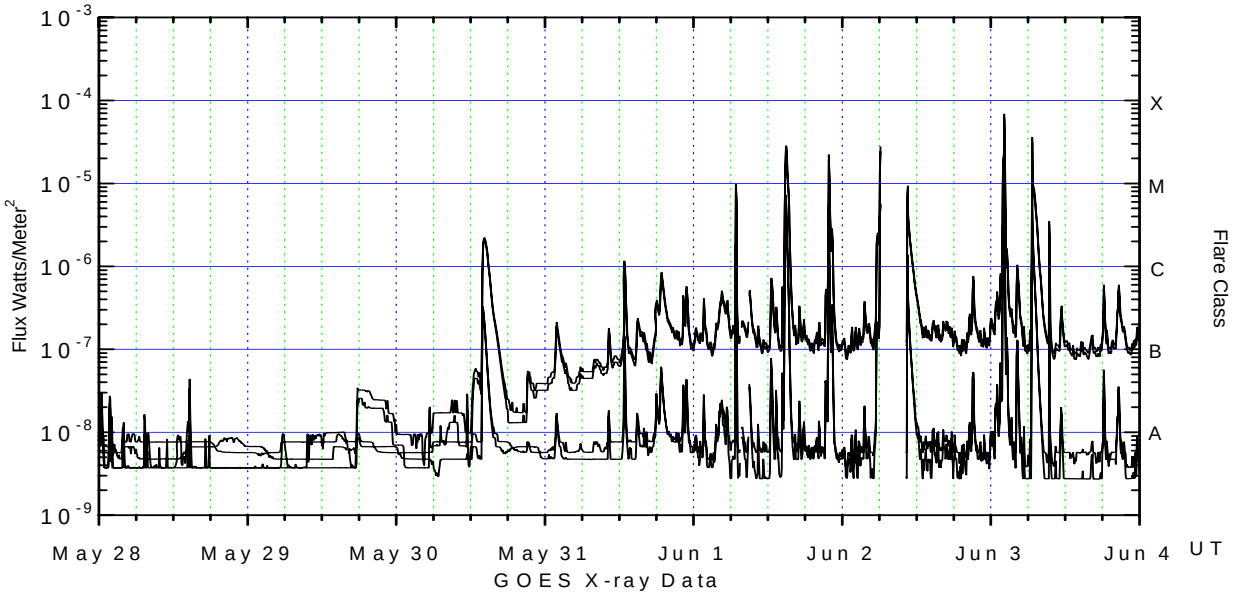
Protons plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec –sr) as measured by GOES-11 (W135) for each of three energy thresholds: greater than 10, 50, and 100 MeV.

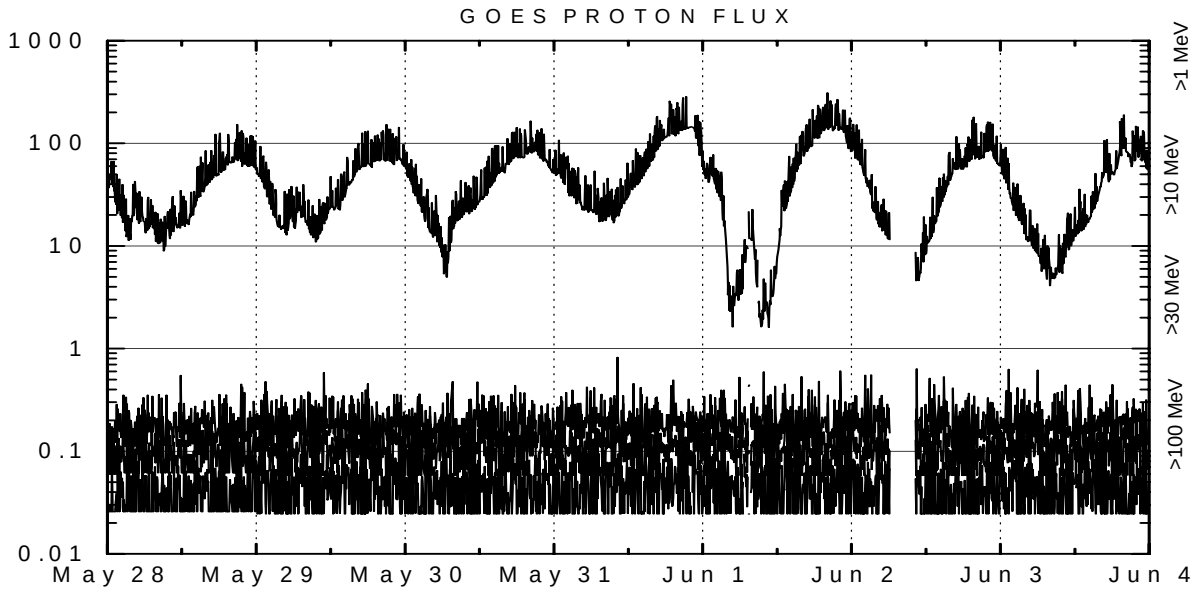
Electrons plot contains the five-minute averaged integral electron flux (electrons/cm^2 –sec –sr) with energies greater than 2 MeV at GOES-12 (W075).

Hp plot contains the five minute averaged magnetic field H - component in nanoteslas (nT) as measured by GOES-12. The H component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

Kp plot contains the estimated planetary 3-hour K-index (derived by the Air Force Weather Agency) in real time from magnetometers at Meanook, Canada; Sitka, AK; Glenlea, Canada; St. Johns, Canada; Ottawa, Canada; Newport, WA; Fredericksburg, VA; Boulder, CO; Fresno, CA and Hartland, UK. These data are made available through cooperation from the Geological Survey of Canada (GSC), British Geological Survey (BGS) and the US Geological Survey. These may differ from the final Kp values derived from a more extensive network of magnetometers.

The data included here are those now available in real time at the SEC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are "global" parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.





Weekly GOES Satellite X-ray and Proton Plots

X-ray plot contains five-minute averaged x-ray flux (watts/m$^{2)}$ as measured by GOES 10 (W060) and GOES 11 (W135) in two wavelength bands, .05 -. 4 and .1 - .8 nm. The letters A, B, C, M and X refer to x-ray event levels for the .1 - .8 nm band.

Proton plot contains the five-minute averaged integral proton flux (protons/cm^2 –sec-sr) as measured by GOES-11 (W135) for each of the energy thresholds: >1, >10, >30 and >100 MeV. P10 event threshold is 10 pfu (protons/cm^2-sec-sr) at greater than 10 MeV.